



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,336	12/09/2003	Hideto Sugawara	81912.0017	3548
26021	7590	07/27/2005	EXAMINER	
HOGAN & HARTSON L.L.P. 500 S. GRAND AVENUE SUITE 1900 LOS ANGELES, CA 90071-2611			LOKE, STEVEN HO YIN	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/731,336	Applicant(s) SUGAWARA, HIDETO	
	Examiner Steven Loke	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9, 10 and 12-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9, 10 and 12-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2811

1. Claims 16, 22, 17 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 9, the parent claims of claims 16 and 22, discloses a first embodiment (figs. 1-7) of the invention showing protrusions having fine recesses formed on a surface thereof. However, the specification never discloses said large protrusions are higher in height than the small protrusions as claimed in claim 16. The specification also never discloses said large protrusions are higher in height and wider in width than the small protrusions as claimed in claim 22.

Claim 10, the parent claims of claims 17 and 23, discloses a first embodiment (figs. 1-7) of the invention showing protrusions whose surface includes regions out of stoichiometric compositions. However, the specification never discloses said large protrusions are higher in height than the small protrusions as claimed in claim 17. The specification also never discloses said large protrusions are higher in height and wider in width than the small protrusions as claimed in claim 23.

2. Claims 9, 10 and 12-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9, lines 11-12, the phrase "provided with protrusions having fine recesses formed on a surface thereof" is unclear whether there is only a recess or a plurality of recesses formed on each of the protrusions.

Claim 10, lines 11-12, the phrase "provided with protrusions whose surface includes regions out of stoichiometric compositions" is unclear whether each of the protrusions whose surface includes regions out of stoichiometric composition.

Claim 12, line 10, the phrase "protrusions formed on a surface thereof" is unclear as to what surface is it being referred.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 9, 12, 13, 15, 18, 19 and 21 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Hayashi et al. (in the IDS filed on 12/9/03).

In regards to claim 9, Hayashi et al. show all the elements of the claimed invention in fig. 7(f). It is a nitride based semiconductor light-emitting device [102], comprising: a substrate [12]; a first conductive type (p-type) nitride based semiconductor layer [25] formed on the substrate [12]; an active layer [24] (n-InGaN barrier layer/n-InGaN well layer) with a p-n junction (formed between the n-type active layer [24] and the p-type cladding layer [25]) formed on said first conductive type nitride based semiconductor layer [25], said active layer being made of a nitride based semiconductor layer having the p-n junction (formed between the n-type active layer [24] and the p-type cladding

Art Unit: 2811

layer [25]); a second conductive type (n-type) nitride based semiconductor layer [21] formed on said active layer [24], said second conductive type nitride based semiconductor layer [21] being provided with protrusions having fine recesses (the protrusions formed at the bottom of layer [21] having fine recesses.) (See the attached enlarged fig. 7(f) at the end of the Office Action) (the recesses are formed on the first, third, fifth and sixth protrusions from the right side of the bottom of layer [21]) formed on a surface thereof; a first ohmic electrode [11] formed on the surface of said second conductive type nitride based semiconductor layer [21]; and a second ohmic electrode [10] formed on said first conductive type nitride based semiconductor layer [25].

In regards to claim 13, Hayashi et al. show said protrusions have small and large ones.

In regards to claim 19, Hayashi et al. show said large protrusions (third and sixth protrusions) are wider in width than the small protrusions (first and fifth protrusions).

In regards to claim 12, Hayashi et al. show all the elements of the claimed invention in fig. 7(f). It is a nitride based semiconductor light-emitting device [102], comprising: a substrate [12]; a first conductive type (p-type) nitride based semiconductor layer [25] formed on the substrate [12]; an active layer [24] (n-InGaN barrier layer/n-InGaN well layer) with a p-n junction (formed between the n-type active layer [24] and the p-type cladding layer [25]) formed on said first conductive type nitride based semiconductor layer [25], said active layer being made of a nitride based semiconductor layer having the p-n junction (formed between the n-type active layer [24] and the p-type cladding layer [25]); a second conductive type (n-type) nitride based semiconductor layer [21]

Art Unit: 2811

formed on said active layer [24], said second conductive type nitride based semiconductor layer [21] being provided with at least two sizes of protrusions (the first to eleventh protrusions formed at the bottom of layer [21] (See the attached enlarged fig. 7(f) at the end of the Office Action) formed on a surface thereof; a first ohmic electrode [11] formed on the surface of said second conductive type nitride based semiconductor layer [21]; and a second ohmic electrode [10] formed on said first conductive type nitride based semiconductor layer [25].

In regards to claim 15, Hayashi et al. further disclose said at least two sizes of protrusions have large and small ones and said large protrusions (first and second protrusions) are higher in height than the small protrusions (tenth and eleventh protrusions).

In regards to claim 18, Hayashi et al. further disclose said protrusions have small and large ones and said large protrusions (second and third protrusions) are wider in width than the small protrusions (first and eleventh protrusions).

In regards to claim 21, Hayashi et al. further disclose said protrusions have small and large ones and said large protrusions (first and second protrusions) are higher in height and wider in width than the small protrusions (fifth and eighth protrusions).

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2811

6. Claims 16, 22, 24, 25, 27, 29, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al.

In regards to claim 16, Hayashi et al. differ from the claimed invention by not showing said large protrusions are higher in height than the small protrusions.

It would have been obvious for the large protrusions are higher in height than the small protrusions because it depends on the desired contact resistance between the n-type GaN substrate and the n-type ohmic electrode.

In regards to claim 22, Hayashi et al. differ from the claimed invention by not showing said large protrusions are higher in height and wider in width than the small protrusions.

It would have been obvious for said large protrusions are higher in height and wider in width than the small protrusions because it depends on the desired contact resistance between the n-type GaN substrate and the n-type ohmic electrode.

In regards to claim 24, Hayashi et al. disclose said protrusions have small and large ones.

Hayashi et al. differ from the claimed invention by not showing said large protrusions are wider in width than the small protrusions but said large protrusions are substantially equal in height to the small protrusions.

It would have been obvious for said large protrusions are wider in width than the small protrusions but said large protrusions are substantially equal in height to the small protrusions because it depends on the desired contact resistance between the n-type GaN substrate and the n-type ohmic electrode.

In regards to claim 25, Hayashi et al. differ from the claimed invention by not showing said large protrusions are wider in width than the small protrusions but said large protrusions are substantially equal in height to the small protrusions.

It would have been obvious for the said large protrusions are wider in width than the small protrusions but said large protrusions are substantially equal in height to the small protrusions because it depends on the desired contact resistance between the n-type GaN substrate and the n-type ohmic electrode.

In regards to claims 27, Hayashi et al. differ from the claimed invention by not showing said large protrusions are substantially hexagons in a plan view.

It would have been obvious for the large protrusions are substantially hexagons in a plan view because it depends on the desired contact resistance between the n-type GaN substrate and the n-type ohmic electrode.

In regards to claims 29, Hayashi et al. differ from the claimed invention by not showing said protrusions are substantially hexagons in a plan view.

It would have been obvious for the protrusions are substantially hexagons in a plan view because it depends on the desired contact resistance between the n-type GaN substrate and the n-type ohmic electrode.

In regards to claims 30, 32, Hayashi et al. differ from the claimed invention by not showing the second conductive type nitride based semiconductor layer is made from p-type InGaAlN system materials.

Art Unit: 2811

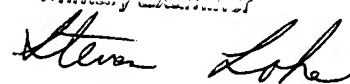
It would have been obvious for the second conductive type nitride based semiconductor layer is made from p-type InGaAlN system materials because it depends on the desired contact resistance and the turn-on voltage of the light-emitting device.

7. Claim 10 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (571) 272-1657. The examiner can normally be reached on 8:20 am to 5:50 pm.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sl
July 24, 2005

Steven Loke
Primary Examiner




7 (f)

102

